

## Pressure-Temperature-Time Paths of Tectonites from the South Tibetan Detachment System, Bhutan Himalaya

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The South Tibetan detachment system (STDS) in the Himalayan orogen is an example of normal-sense displacement on an orogen-parallel shear zone during lithospheric contraction. *In situ* monazite U(-Th)-Pb geochronology, textural observations and metamorphic pressure and temperature estimates constrain pressure-temperature-time (P-T-t) paths for both the hanging wall and footwall rocks of a Miocene ductile component of the STDS (outer STDS) now exposed in the Bhutan Himalaya. The outer STDS is located south of a younger, ductile/brittle component of the STDS (inner STDS), and is characterized by structurally-upward decreasing metamorphic grade corresponding to a transition from sillimanite-bearing Greater Himalayan sequence (GHS) rocks in the footwall with garnets that preserve diffusive chemical zoning to staurolite-bearing Chekha Group rocks in the hanging wall with garnets that record prograde chemical zoning. Monazite ages indicate that garnet growth in GHS footwall rocks occurred prior to  $22.6 \pm 0.4$  Ma, and that peak temperatures were reached following ca. 20.5 Ma. In contrast, peak temperatures were reached in the Chekha Group hanging wall by ca. 22 Ma. Normal-sense (top-to-the-north) shearing in both the hanging wall and footwall followed peak metamorphism and continued until at least ca. 16 Ma. Retrograde P-T-t paths are compatible with modeled P-T-t paths for an outer STDS analogue that is isolated from the inner STDS by intervening extrusion of a dome of mid-crustal material.